CLAIMS

1. A proximity sensor characterized by comprising an electrically conductive member integrally or separably mounted on a mounting object, a detection area made of an electromagnetic wave radiation space set at an outside of the said electrically conductive member and accompanying a change of a humidity, a temperature and a barometric pressure, and a microwave circuit making the said electrically conductive member act as an antenna and radiate microwaves of a sufficiently short wavelength relative to a size of the said electrically conductive member so as to detect an existence of a detection object residing in a space inside the said detection area as a change of an eigenvalue of a radio wave propagation, thereby detecting the change of the said eigenvalue by the said microwave circuit as a change of the said detection area.

2. A proximity sensor as recited in claim 1 characterized in that the said microwave circuit comprises an UWB (Ultra Wide Band) oscillator supplying a wideband frequency of the microwaves radiated from the said electrically conductive member, a resonant circuit is formed between the said electrically conductive member and the said detection area and the change of the said detection area is detected based upon a difference of a propagation state of a frequency supplied from a feeding point of the said UWB oscillator.

3. A proximity sensor as recited in claim 1 characterized in that the change of the eigenvalue of the said radio wave propagation is detected by use of a mixer, which makes the frequency of the said electrically conductive member passed through a directional coupler connected to the feeding point of the UWB oscillator and a bandpass filter and thereafter amplified by an amplifying means while inputting a down-converting frequency for mixing, and a recognition circuit

detecting the change of the said detection area by a frequency passed through the said mixer.

4. A proximity sensor as recited in claim 2 characterized in that the change of the eigenvalue of the said radio wave propagation is detected by use of a mixer, which introduces the frequency of the said electrically conductive member from the said one or two or more receiving points arranged individually and inputs a down-converting frequency for mixing, and a recognition circuit detecting the change of the said detection area by a frequency passed through the said mixer.

5. A proximity sensor as recited in one of claim 2 to claim 4 characterized in that the change of the eigenvalue of the said radio wave propagation is detected by forming a resonant circuit between the said electrically conductive member and the said detection area so as to perform detection based upon a change of a propagation state of a frequency supplied from a feeding point of the said UWB oscillator as the change and a moving speed of the said detection object.

6. A proximity sensor as recited in claim 5 characterized in that the change and the moving speed of the said detection object is recognized by use of a mixer, which introduces the frequency of the said electrically conductive member and inputs a down-converting frequency for mixing, and a recognition circuit detecting the change and the moving speed of the said detection object by a frequency passed through the said mixer.

7. A proximity sensor as recited in claim 1 characterized in that the said microwave circuit comprises a microwave oscillating portion forming a resonant circuit of the microwaves including the said detection area.

8. A proximity sensor as recited in claim 7 characterized in that the said microwave oscillating portion comprises an output oscillator supplying a frequency

producing the microwaves radiated from the said electrically conductive member, a mixer mixing a frequency of the microwaves obtained from the electrically conductive member and a frequency obtained from a time-base generator so as to detect a predetermined frequency, a bandpass filer selecting only a specific frequency from a frequency mixed by the said mixer and a feedback system feeding back to the said output oscillator by a frequency passed through the said bandpass filter.

9. A proximity sensor as recited in claim 7 or claim 8 characterized in that the said microwave oscillating portion comprises a recognition circuit distinguishing the change of the said detection area by a standing wave of a frequency passed through the said bandpass filter.

10. A proximity sensor as recited in claim 1 characterized in that the said microwave circuit comprises an output oscillator outputting the microwaves to the said electrically conductive member and a deemed circuit deemed as a cavity resonant circuit is formed between the said electrically conductive member and a detection object in the said detection area when the detection object resides in the detection area set at the outside of the said electrically conductive member, thereby obtaining a frequency of the said deemed circuit from the said output oscillator so as to detect the detection object in the said detection area as a change of an oscillating frequency of the said output oscillator.

11. A proximity sensor as recited in claim 10 characterized by comprising, at an output side of the said output oscillator, a mixer mixing the frequency outputted from the said output oscillator and a frequency obtained from a time-base generator and a recognition circuit recognizing the detection object inside the detection area set at the outside of the said electrically conductive member.

12. A proximity sensor as recited in claim 10 or claim 11 characterized in that the said output oscillator is made of a dielectric oscillator or an LC oscillator.

13. A proximity sensor as recited in claim 1 characterized in that an oscillating circuit oscillating the microwaves is made by setting a feeding point and a receiving point are set on the said electrically conductive member of the said microwave circuit and amplifying a frequency obtained from the said receiving point and feeding back the said frequency to the said feeding point, thereby detecting the change of the said detection area as a change of a frequency obtained from the said oscillating circuit.

14. A proximity sensor as recited in claim 13 characterized by comprising an oscillating circuit composed of a bandpass filter making a frequency obtained from the said receiving point of the said electrically conductive member into a specific frequency range and a high-frequency amplifier amplifying and feeding back the frequency of the said frequency range to the said feeding point, a directional coupler connected on a route from the said receiving point to the feeding point so as to detect an oscillating state of the said oscillating circuit, a mixer inputting a down-converting frequency so as to mix and detect a feedback state generated by the said directional coupler and a recognition circuit recognizing the change of the detection area by a frequency passed through the said mixer.

15. A proximity sensor as recited in one of claim 1 to claim 14 characterized in that the said electrically conductive member is an opening/closing body mounted openably and closably on a vehicle.